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Mites of the Macrochelid Genus *Neopodocinum* (Arachnida: Acari: Gamasida: Macrochelidae) Associated with Dung Beetles in West Java, Indonesia

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Three species of the genus *Neopodocinum* (Macrochelidae) were recorded from the body surface of dung beetles in West Java, Indonesia. One species was identified as *N. spinirostris* (Berlese, 1910) and the other two are described here as new to science. *Neopodocinum halimunensis* sp. nov. is distinguishable from congeners by an expanded anal shield with two pairs of preanal setae in both sexes. *Neopodocinum subjaspersi* sp. nov. differs from the related species *N. jaspersi* (Oudemans, 1900) in the pectination of some dorsal and opisthogastric setae.
Key Words: new species, Macrochelidae, *Neopodocinum*, mites, Scarabaeidae.

Introduction

The macrochelid mite genus *Neopodocinum*, consisting of more than 30 species (Takaku, unpublished), is widely distributed in Asia, Africa, and Europe (Krantz 1965). Although mites of this genus are expected to occur widely in Indonesia, the Indonesian fauna of *Neopodocinum* has very poorly been studied. Krantz (1965) recognized six species from Indonesia in his monograph: *N. jaspersi* (Oudemans, 1900), *N. javensis* Krantz, 1965, and *N. spinirostris* (Berlese, 1910) from Java; and *N. maius* Berlese, 1911, *N. nederveeni* Oudemans, 1903, and *N. vosi* Oudemans, 1903 from Sumatra. Recently, Takaku and Hartini (2001) recorded *N. spinirostris* from Bali.

In the course of our taxonomic study of the Indonesian macrochelid mites, three species of the genus *Neopodocinum* were collected in the Gunung Halimun National Park and Mt. Salak, West Java. Two of these species are described as new to science.

All the mite specimens were taken from the ventral surface of scarabaeid dung beetles collected by dung traps, and fixed with 70% ethyl alcohol. Specimens were mounted on glass slides in lactic acid to observe under a compound microscope, and then they were mounted on glass slides in Hoyer's medium or PVA (polyvinyl alcohol–lactic acid mixture) medium. Some specimens were dissected under a stereoscopic microscope after clearing in lactic acid, and each body part was

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mounted on a glass slide. Observations and photographs were made with a compound, phase contrast, and differential interference contrast microscope (DIC). Drawings were prepared with the aid of a drawing tube.

The holotype and additional specimens of *N. jaspersi* collected in the Netherlands, Java, and Bombay were borrowed from the National Museum of Natural History (RMNH), Leiden; voucher specimens of *N. jaspersi* collected in central India were borrowed from the collection of Oregon State University (OSU), U.S.A., for comparison. Besides these loan specimens, we observed our own specimens of *N. maius* and *N. jaspersi* collected in Sumatra and Bali, respectively.

In the present study all measurements are given in micrometers (μm). Measurements are provided as averages and range in parentheses in each description, when more than two specimens are measured. Dorsal chaetotaxy follows Halliday (1987), and other terminology, especially the terms of sternal ornamentation, follows Krantz (1965). The holotypes will be deposited in the collection of the Museum Zoologicum Bogoriense, Bogor, Indonesia (MZB), and the remaining specimens are retained in the MZB and the Zoological Collection of the Graduate School of Science, Hokkaido University, Sapporo, Japan (ZIHU).

Descriptions and Locality Records

Family **Macrochelidae** Vitzthum, 1930

Genus ***Neopodocinum*** Oudemans, 1902

Diagnosis. Dorsal shield with 28–31 pairs of setae and often with additional unpaired seta (Jx) on posteromedial portion; venter with anal shield in most species (anal shield rarely laterally expanded); peritreme looped or straight posteriorly; tectum unipartite; trochanter III with 4 setae; genu IV with 7 or 8 setae.

Neopodocinum spinirostris (Berlese, 1910)

Megalolaelaps spinirostris Berlese, 1910: 258.

Neopodocinum spinirostris: Krantz 1965: 191–193, figs 57–59; Takaku and Hartini 2001: 323–342, figs 14–35, 38–46.

Berlese (1910) described this species under the genus *Megalolaelaps* based on a specimen from Java, and his description was adopted in the review of the genus *Neopodocinum* by Krantz (1965). We have provided detailed descriptions of adults and immatures based on specimens collected in Bali (Takaku and Hartini 2001).

Material examined. Two females and 2 males, 830 m above sea level, Mt. Salak, Sukamantri, Ciomas, Bogor, Indonesia, 10–13 September 2001, Sarino leg., *ex Onthophagus* sp.

Habitat. This species has been collected from dung beetles *Copris* sp. (Berlese 1910) and *Catharsius* sp. (Takaku and Hartini 2001).

Distribution. *Neopodocinum spinirostris* was previously recorded from Java (Berlese 1910; Krantz 1965) and Bali (Takaku and Hartini 2001).

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Neopodocinum halimunensis sp. nov.
(Figs 1–25, 53–55)

Description. *Female.* Length of dorsal shield 971 (910–1025), width at level of coxae II 591 (530–700) (n=13). Living specimens reddish brown.

Dorsum (Figs 1, 53): Dorsal shield oval, attenuated posteriorly; surface strongly punctate in lateral parts, with anterior ridges and flaps over setal insertions; lateral margin of shield smooth; shield with 28 pairs of dorsal setae and 22 pairs of pores; unpaired seta Jx present; setae j1 broad and plumose; z1 short and half length of j1, and plumose; j2, s2, r2, S1, S2, S4, S5, Z3, Z4, and Z5 pilose, and other dorsal setae simple.

Venter (Figs 2, 54): Tritosternum well developed and with pilose laciniae. Sternal shield wider than long, 86 (80–100) long and 218 (205–259) wide at level of coxae II (n=13); surface of shield with punctate area behind linea media transversa (l.m.t.); l.m.t. broken medially in all specimens, except for one specimen with complete l.m.t.; shield with 3 pairs of simple setae and 2 pairs of pores; all setae long, but not surpassing insertions of setae behind them. Metasternal shield small, free from sternal shield; each shield with simple seta and anterior pore. Endopodal shield fused with posterior parts of sternal plate; postcoxal pore free from podal shield.

Length of epigynial shield 144 (105–190), width 265 (245–285); surface of shield strongly punctate (Fig. 54) and with long, simple setae on lateral sides. Anal shield expanded triangularly as "ventrianal" shield, wider than long, 282 (255–305) long and 345 (300–380) wide (n=13); surface of shield with strong punctations like that of epigynial shield; 2 pairs of preanal setae present; anal portion of shield with strong punctate pattern anteriorly, longer than wide, 153.1 (135–170) long and 127 (110–140) wide (n=13), and with pair of paranal setae and 1 postanal seta; all setae simple and thick. Cribrum located on posterior margin of anal portion with its anterior extensions surpassing level of paranal setae. Peritreme joining stigmata at point lateral to coxae III–IV and extending anterodorsally to points lateral to setae z1. Two pairs of oblong platelets present in two specimens (absent in others) between epigynial and "ventrianal" shield. Metapodal shield absent; opisthogaster bearing more than 20 pairs of simple and slightly pilose setae.

Gnathosoma (Fig. 3): Gnathosoma well developed and sclerotized. Deutosternal groove with 5 rows of denticles; 3 pairs of hypostomal setae and a pair of palpcoxal setae present; all setae simple. Palpal chaetotaxy of trochanter, femur, and genu 2-5-6. Palptarsus with trifurcate apotele. Tectum (Fig. 4) unipartite, with many long spines laterally and dorsally, and with serrate basal margin. Fixed digit of chelicera (Fig. 5) with simple dorsal seta, robust median tooth, small distal tooth, *pilus dentilis*, and terminal hook; movable digit with median bidentate tooth, small distal tooth, and terminal hook; arthrodial process strongly pilose and similar length to that of movable digit; length of fixed digit 236 (220–250) (n=7), length of movable digit 105 (100–112.5) (n=13).

Legs: Tarsus I without ambulacrum, with long one seta distally; tarsi II–IV with well developed ambulacra and claws. Most leg segments with simple setae and pilose, plumose, or pectinate setae, except for coxae II–IV and trochanter IV with only simple setae, and tarsi I and II, femur IV, and trochanter III with simple and thick setae; coxa I with posteroventral ridge; coxae II–IV each with 2 posterior

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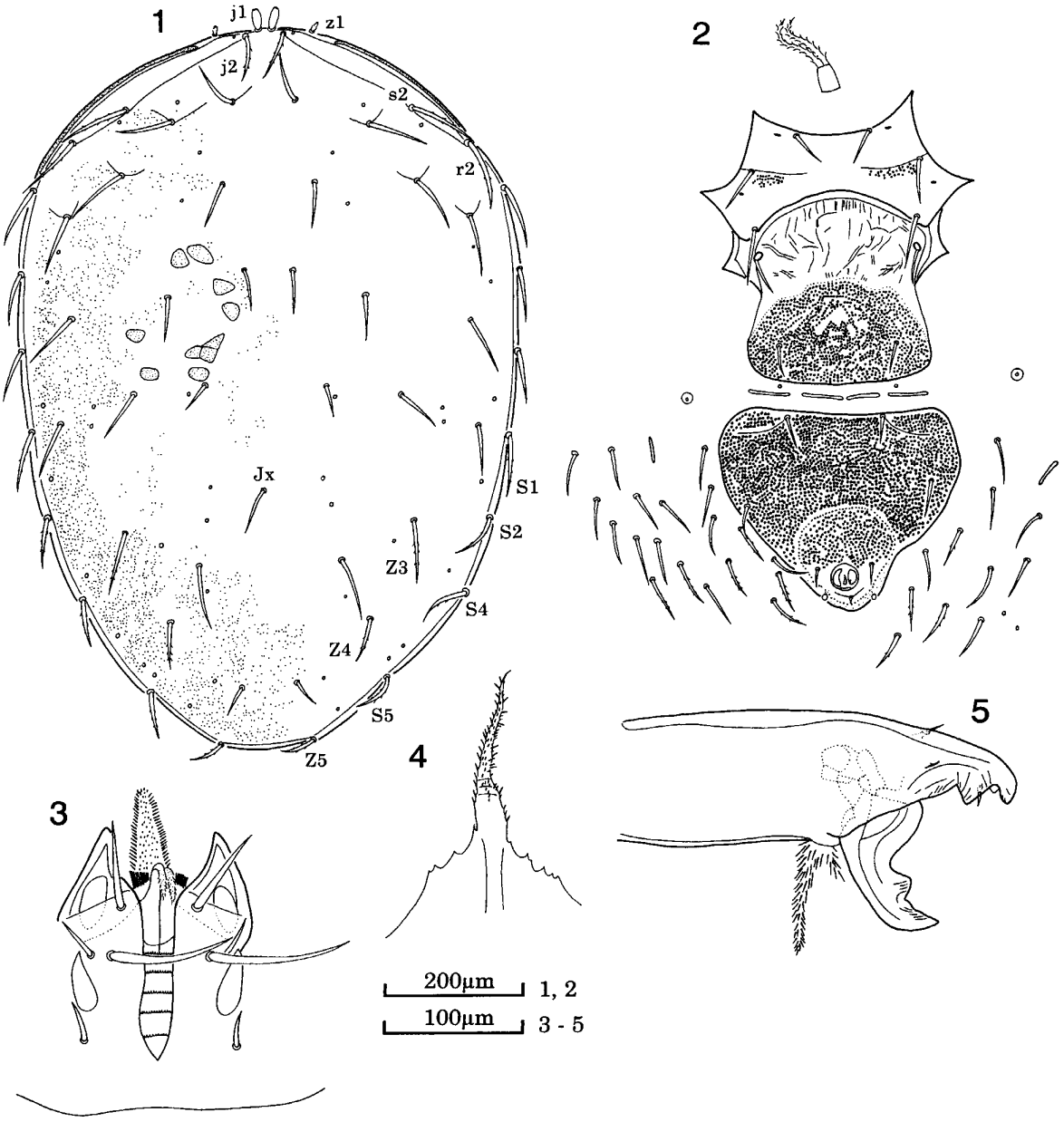

Figs 1–5. *Neopodocinum halimunensis* sp. nov., female, holotype (MZB.Acar.2310). 1, dorsum; 2, venter; 3, ventral view of gnathosoma; 4, tectum; 5, chelicera.

ridges. Leg chaetotaxy typical for this genus; trochanter III with 4 setae; genu IV with 7 setae, and its chaetotaxy 1,2/1,2/0,1. Leg length (except ambulacrum, n=13): leg I, 597 (480–670) (n=12); leg II, 669 (575–755); leg III, 617 (535–670); leg IV, 756 (695–805).

Sacculus foemineus: Not observable.

Male. Length of dorsal shield 921 (770–1090), width 601 (500–715) (n=20). Living specimen reddish brown.

Dorsum (Fig. 6): Dorsal shield as in female; setae j1 and z1 short, broad, and plumose; j2, r2, S1, S2, S4, S5, and Z5 pilose; J5 short and simple; seta Jx present, and other setae simple.

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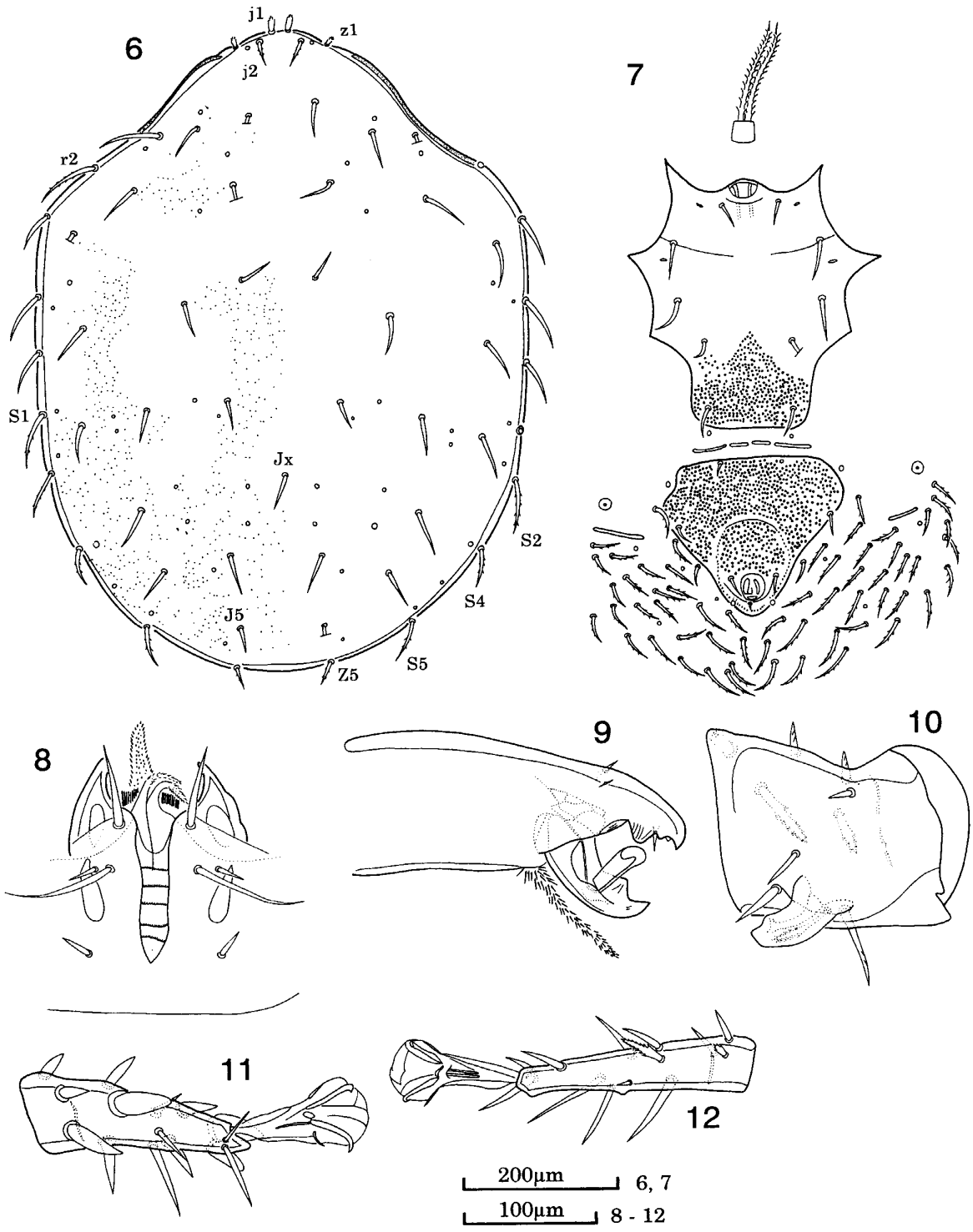

Figs 6–12. *Neopodocinum halimunensis* sp. nov., male, paratype (MZB.Acar.2258.1). 6, dorsum; 7, venter; 8, ventral view of gnathosoma; 9, chelicera; 10, femur II; 11, tarsus II; 12, tarsus IV.

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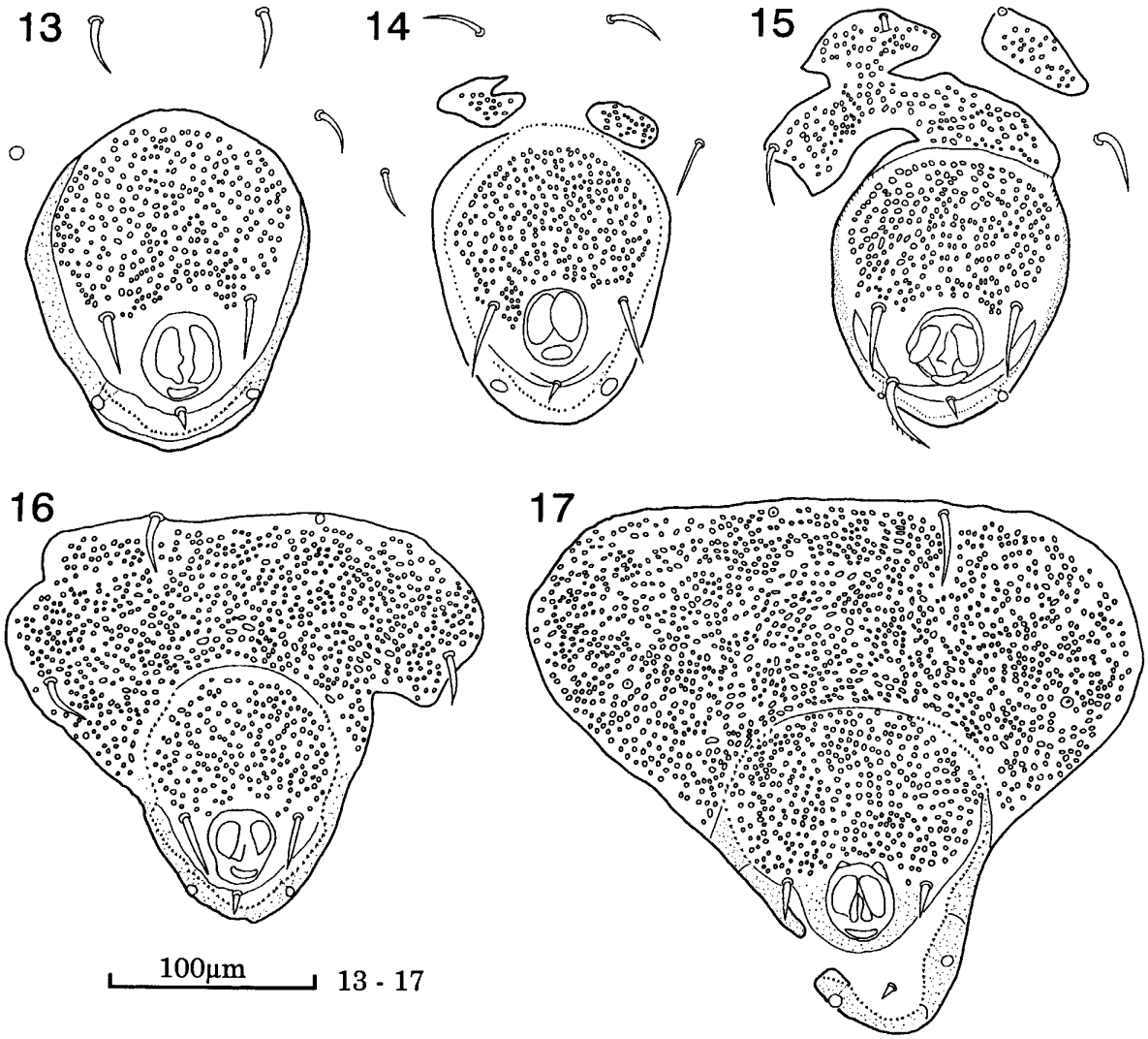
Venter (Figs 7, 55): Tritosternum as in female. Sternoventral shield longer than wide, 349 (290–405) long and 179 (150–205) wide at level of coxae II (n=20); surface of shield ornamented with reticulation and punctations in anterior half, and with strong punctations in posterior triangular area (Fig. 55); l.m.t. broken medially; 5 pairs of simple setae and 3 pairs of pores present.

Anal shield variable in shape, with small anal shield expanded into large "ventrianal" shield as in female (Figs 13–17). "Ventrianal" shield with strong punctations, wider than long, 221 (200–255) long and 254 (225–295) wide (n=20); 2 pairs of preanal setae present; all setae simple. Anal portion longer than wide, 147 (130–180) long, with pair of paranal setae and 1 postanal seta; all setae simple and thick; unpaired pilose seta rarely located near cribral pore (Fig. 15). Cribrum located on lateral margin of anal portion; anterior extensions surpassing level of paranal setae. Opisthogastric setae simple and slightly pilose. Two pairs of oblong platelets present between sternoventral and "ventrianal" shields.



Figs 13–17. Variations of anal shield of males of *Neopodocinum halimunensis* sp. nov., paratypes. 13, MZB.Acar.2248.1; 14, MZB.Acar.2263; 15, MZB.Acar.2312.3; 16, MZB.Acar.2312.1; 17, MZB.Acar.2256.

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Gnathosoma (Fig. 8): Gnathosoma as in female. Fixed digit of chelicera (Fig. 9) with simple dorsal seta, robust median tooth, small distal tooth, *pilus dentilis*, and terminal hook; movable digit with median tooth, spermatodactyl, and terminal hook; spermatodactyl short; arthrodial process strongly pilose; length of fixed digit 225 (207.5–292.5) (n=13), length of movable digit 110 (97.5–127.5) (n=20).

Legs (Figs 10–12): Tarsus I without ambulacrum and claw; tarsi II–IV with developed ambulacra and claws. Most leg segments with simple setae and pilose, plumose, or pectinate setae, except for tarsi I and IV, femora III and IV, trochanter III, and coxae I–IV with only simple setae, and tarsus II (Fig. 11) with simple and thick setae. Coxa I and trochanter III each with posterior ridge; coxae II–IV with 2 posterior ridges; femur II with large spur (Fig. 10); genu and tibia II each with spur and ridge; tarsus IV (Fig. 12) with protuberances. Leg chaetotaxy as in female. Leg length (except ambulacrum, n=20): leg I, 578 (410–745); leg II, 668 (558–755); leg III, 619 (490–785); leg IV, 896 (710–1205).

Deutonymph. Length of dorsal shield 701 (660–765), width 408 (355–445) ((n=11). Living specimens reddish or yellowish brown.

Dorsum (Fig. 18): Dorsal shield attenuated posteriorly, ornamented with strong punctations posteriorly, and with lateral incisions behind dorsal setae s6; lateral margin smooth; shield bearing 28 pairs of dorsal setae and 8 pairs of pores; seta Jx present; j1 and z1 short and plumose; other setae simple.

Venter (Fig. 19): Tritosternum as in female. Sternoventral shield longer than wide, 231 (205–245) long and 136 (115–150) wide at level of second sternal pore (n=11); surface of shield ornamented with slight reticulation and punctations; shield with 4 pairs of simple setae and 3 pairs of pores; st1–3 simple and long but not surpassing insertion of setae behind them; st4 shorter than other sternoventral setae.

Anal shield oval, longer than wide, 123 (105–135) long and 72 (55–80) wide (n=11); shield ornamented with punctations anteriorly, and with pair of paranal setae and 1 postanal seta; all setae simple. Cribrum located on lateral margin of anal shield, its anterior extensions surpassing level of paranal setae. Opisthogaster bearing more than 20 pairs of simple and pectinate setae; postcoxal pore free. Peritreme as in female.

Gnathosoma (Fig. 20): Gnathosoma as in female. Fixed digit of chelicera (Fig. 21) with simple dorsal seta, robust median tooth, small distal tooth, *pilus dentilis*, and terminal hook; movable digit with median blunt-tipped tooth and terminal hook; arthrodial process strongly pilose; length of fixed digit 178 (145–200) (n=7) and of movable digit 80 (75–92.5) (n=11).

Legs: Tarsus I without ambulacrum and claw; tarsi II–IV with developed ambulacra and claws. Most leg segments with some pectinate setae, except for coxae I–IV, tarsus I, and trochanters I and III with only simple setae. Tarsus II, tibia, genu, femur, and trochanter III, and trochanter and femur IV with simple and thick setae. Coxa I with ventral ridge; coxae II–IV each with 2 posterior ridges. Leg chaetotaxy as in female; genu IV with 7 thick, simple setae, and its chaetotaxy 1,2/1,2/0,1. Leg length (except ambulacrum, n=11): leg I, 451 (390–505); leg II, 510 (410–575); leg III, 478 (445–520); leg IV, 596 (555–635).

Protonymph. Length of podonotal shield 364 (347.5–380), width 308 (275–335).

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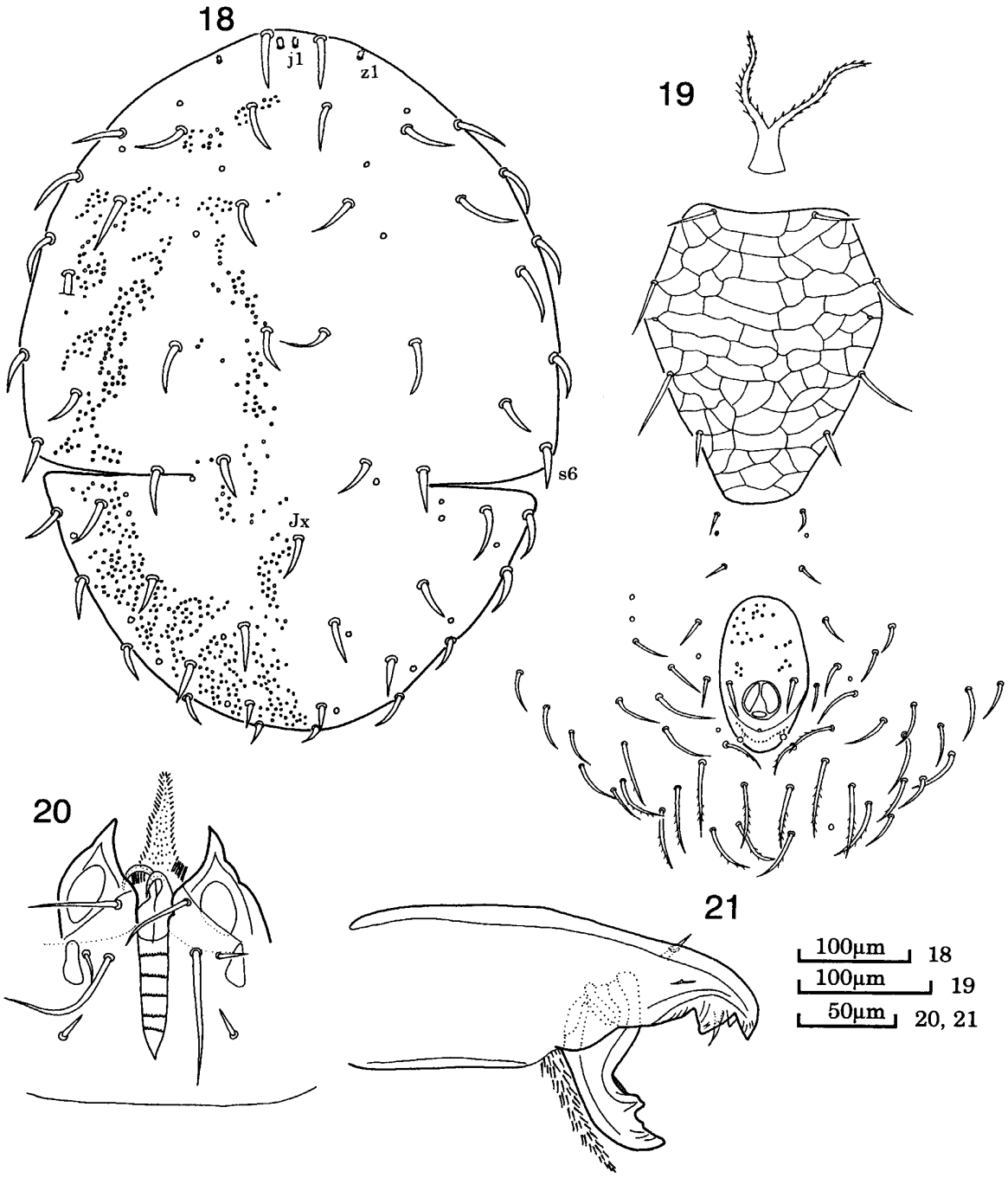

Figs 18–21. *Neopodocinum halimunensis* sp. nov., deutonymph, paratype (MZB.Acar.2313.1). 18, dorsum; 19, venter; 20, ventral view of gnathosoma; 21, chelicera.

Length of opisthonotal shield 127 (107.5–137.5), width 286 (260–300) (n=9). Living specimen yellowish brown.

Dorsum (Fig. 22): Podonotal shield convex posteriorly, ornamented with punctations except for anterior part, and bearing 11 pairs of podonotal setae; seta j1 plumose; other podonotal setae strongly pectinate. Opisthonotal shield concave anteriorly and with 8 pairs of pectinate setae; J5 shorter than other setae; seta Jx absent.

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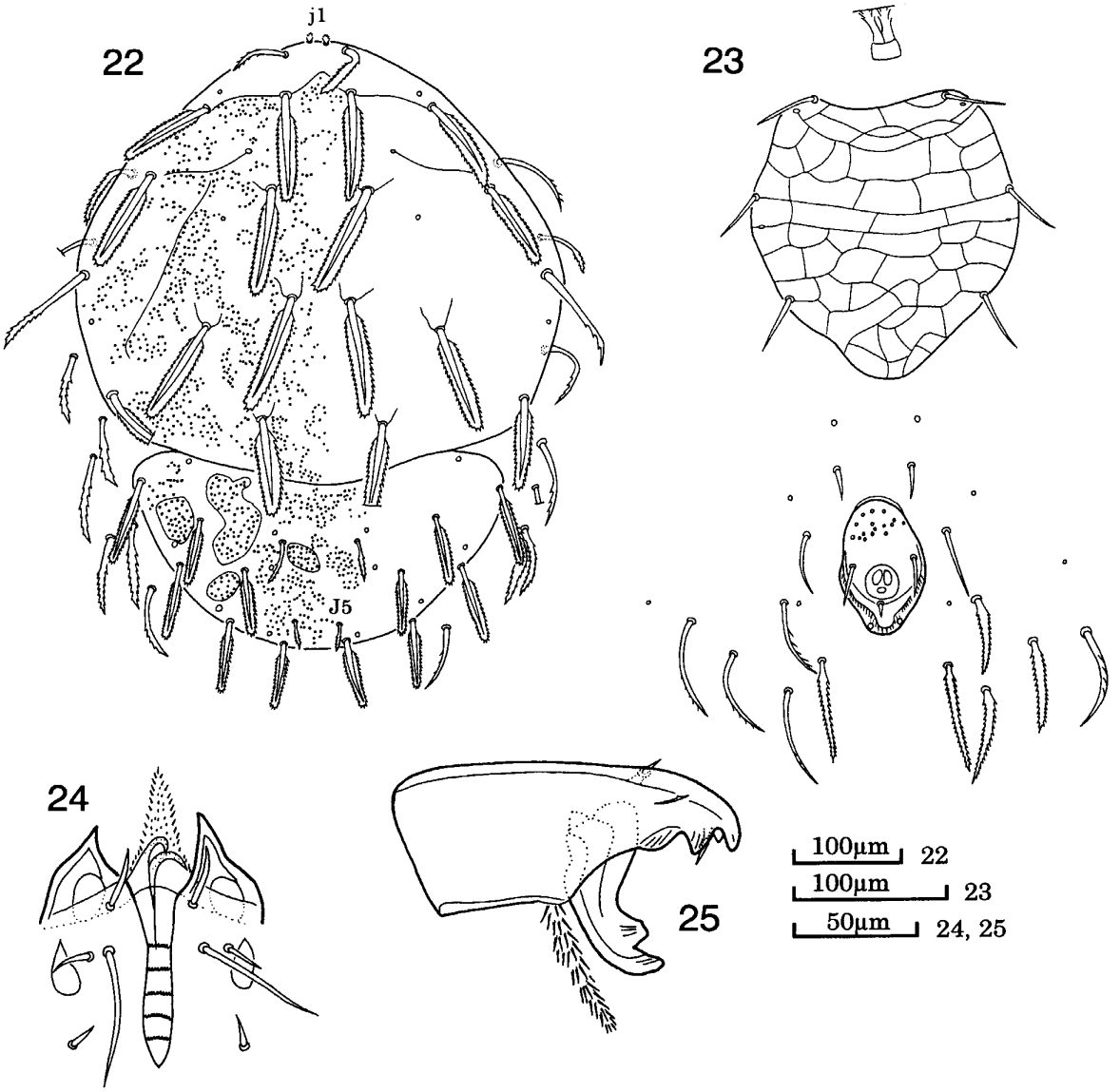

Figs 22–25. *Neopodocinum halimunensis* sp. nov., protonymph, paratype (MZB.Acar.2253.3). 22, dorsum; 23, venter; 24, ventral view of gnathosoma; 25, chelicera.

Venter (Fig. 23): Tritosternum as in female. Sternoventral shield longer than wide, 180 (159.5–195) long and 118 (95–135) wide (n=9); surface of shield ornamented with slight reticulation and punctations, and bearing 3 pairs of simple setae and 2 pairs of pores; all setae simple.

Anal shield oval, narrowed anteriorly and posteriorly, longer than wide, 90 (82.5–95) long and 50 (45–52.5) wide; surface of shield ornamented with punctations anteriorly; shield with pair of paranal setae and 1 postanal seta. Cribrum located on lateral margin of anal shield; anterior extensions surpassing level of paranal setae. Opisthogaster bearing more than 5 pairs of simple and pectinate setae.

Gnathosoma (Fig. 24): Gnothosoma well developed. Palpal chaetotaxy of trochanter, femur, and genu 1-4-5. Internal posterior hypostomal setae longer than other hypostomal and palpcoxal setae. Fixed digit of chelicera (Fig. 25) with simple dorsal seta, robust median tooth, small distal tooth, *pilus dentilis*, and terminal

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hook; movable digit with median bidentate tooth, small distal tooth, and terminal hook; arthrodial process strongly pilose; length of fixed digit 144 (130–150) (n=5) and of movable digit 63 (52.5–72.5) (n=9).

Legs: Tarsus I without ambulacrum and claw; tarsi II–IV with developed ambulacra and claws. Most leg segments with some pectinate setae, except for coxae I, III, and IV, trochanters I, III, and IV, tarsus I, tibia II, and femur IV with only simple setae and tarsus III with thick, simple setae. Trochanter, femur, and genu II each with 2 long, pectinate setae. Coxa I with ventral ridge, coxae II–IV with 2 posterior ridges. Leg chaetotaxy typical for protonymphs of this genus; trochanter III with 4 simple setae; genu IV with 5 pectinate and simple setae, and its chaetotaxy 1,2/0,2/0,0. Leg length (except ambulacrum, n=9): leg I, 347 (320–375); leg II, 382 (375–412.5); leg III, 364 (349–282.5); leg IV, 430 (390–450).

Type series. Holotype: female (MZB.Acar.2310), 950 m above sea level, Halimun National Park, Cikaniki, Bogor, Indonesia, 25–26 February 2001, S. Rofik and Sarino leg., *ex Onthophagus* sp. Paratypes: 8 females, 18 males, 10 deutonymphs, and 4 protonymphs, same data as for holotype; 4 females, 2 males, 1 deutonymph, and 4 protonymphs, 980 m above sea level, Mt. Salak, Sukamantri, Ciomas, Bogor, Indonesia, 10–13 September 2001, Sarino leg., *ex Onthophagus* sp.

Etymology. The species name is derived from the type locality.

Remarks. The expanded anal shield bearing preanal setae is the most impressive character of the new species. A similar feature has been recorded in *N. magna* Krantz, 1965 from Central Africa (Krantz 1965); however, *N. halimunensis* is distinguished from *N. magna* by the following characters (corresponding conditions of *N. magna* in parentheses): 1) dorsal setae j2, s2, r2, S1, S2, S4, S5, and Z5 pilose in male (simple); 2) j2, r2, s2, S1, S2, S4, S5, Z3, Z4, and Z5 pilose in female (simple); 3) j1 and z1 short and plumose in deutonymph (smooth); 4) epigynial setae located on lateral side of epigynial shield (on posterolateral corner of epigynial shield); 5) expanded anal shield of female with 2 pairs of preanal setae (only 1 pair); 6) anal shield expanded in most of males (not expanded).

Neopodocinum maius Berlese, 1911 recorded from Sumatra, Indonesia, also has a broad anal shield (Berlese 1911; Vitzthum 1926; Krantz 1965); however, *N. halimunensis* differs from *N. maius* in the following female characters (corresponding conditions of *N. maius* in parentheses): 1) some marginal and Z series setae pilose (plumose distally); 2) expanded anal shield with 2 pairs of preanal setae (without preanal setae).

Neopodocinum subjaspersi sp. nov.
(Figs 26–29, 32–52, 56)

Description. *Female.* Length of dorsal shield 1006 (945–1045), width at level of coxae II 566 (500–625) (n=9). Living specimens yellowish brown.

Dorsum (Fig. 26): Dorsal shield oval, attenuated posteriorly; surface strongly punctate posteriorly; lateral margins smooth; shield bearing 28 pairs of dorsal setae and 22 pairs of pores; unpaired Jx seta present; setae j1 broad and plumose; z1 short and plumose; j2, s2, r2, s6, S1, S2, S4, S5, Z5, and J2 pilose; other dorsal setae simple.

Venter (Figs 27–29, 56): Tritosternum well developed and with pilose laciniae.

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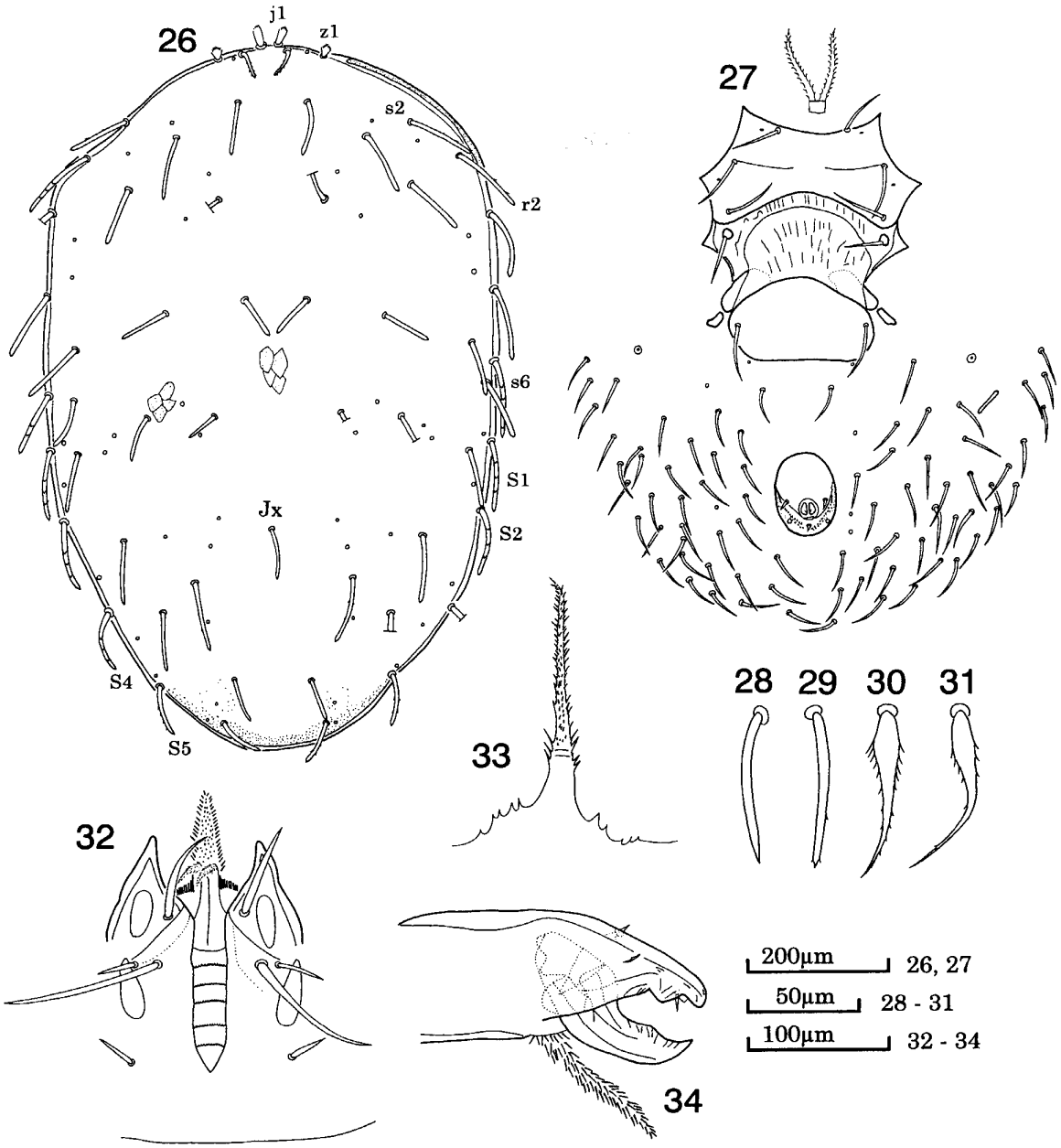

Figs 26–34. *Neopodocinum subjaspersi* sp. nov., female, holotype (MZB.Acar.2275) (26, 27, 32–34) and paratype (28, 29), and *N. jaspersi* (Oudemans, 1900), female (30, 31). 26, dorsum; 27, venter; 28–31, opisthogastric setae [28, 29, ZIHU-2110; 30, Central Indian specimen (OSU); 31, the Netherlands specimen (RMNH; holotype; ACA P3853)]; 32, ventral view of gnathosoma; 33, tectum; 34, chelicera.

Sternal shield wider than long, 107 (99–115) long and 230 (225–235) wide at level of coxae II (n=9); surface of the shield ornamented with slight reticulation and punctations; l.m.t. broken medially; shield with 3 pairs of simple setae and 2 pairs of pores; all setae long and surpassing insertions of setae behind them. Endopodal shield fused with sternal plate. Metasternal shield small and free from sternal shield; each shield with simple seta and anterior pore.

Epigynial shield with pair of long, simple setae on lateral side and with pair of

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auxiliary sclerietes; ornamentation of shield same as sternal pattern.

Anal shield small, oval, longer than wide, 148 (135–160) long and 111 (105–120) wide, with pair of paranal setae, 1 postanal seta, and pair of pores on posterior margin; all setae simple; ornamentation of shield same as sternal pattern. Cribrum located on lateral margin of anal shield; anterior extensions surpassing level of paranal setae. Opisthogaster bearing more than 50 pairs of simple or slightly pilose setae (Figs 28, 29, 56); most setae surpassing insertions of setae behind them; postcoxal pore free from podal shield. Peritrematic shield developed, with short posterior extensions and long fossa laterally; anterior extremities extending to points lateral of setae z1.

Gnathosoma (Fig. 32): Gnathosoma well developed and sclerotized; deutosternal groove with 4 or 5 rows of denticles; 3 pairs of hypostomal setae and pair of palpcoxal setae present; all setae simple; length of internal posterior hypostomal setae four times that of external posterior hypostomal setae. Palpal chaetotaxy of trochanter, femur, and genu 2-5-6; palptarsus with trifurcate apotele. Tectum (Fig. 33) unipartiate, with long spine laterally. Fixed digit of chelicera (Fig. 34) with simple dorsal seta, robust median tooth, small distal tooth, *pilus dentilis*, and terminal hook; movable digit with median bidentate tooth, small distal tooth, and terminal hook; arthrodial process strongly pilose; length of fixed digit 238 (220–252.5) (n=9), and of movable digit 113 (105–125) (n=7).

Legs: Tarsus I without ambulacrum and claw, and with long setae distally. Tarsi II–IV with developed ambulacra and claws. Most leg segments with some pectinate setae, except for coxae I–IV, tarsi I and III, and trochanters I and II with only simple setae; coxa I with ventral ridge; coxae II–IV each with 2 posterior ridges. Leg chaetotaxy typical for this genus; trochanter III with 4 setae; genu IV with 7 simple and pilose setae, and its chaetotaxy 1,2/1,2/1,0. Leg length (except ambulacrum, n=9): leg I, 598 (470–665); leg II, 684 (610–760); leg III, 603 (580–720); leg IV, 818 (735–860).

Sacculus foemineus: Not observable.

Male. Length of dorsal shield 1072 (1000–1120), width 617 (640–685) (n=3). Living specimens reddish brown.

Dorsum (Fig. 35): Dorsal shield as in female; unpaired Jx present; setae j1 and z1 short, broad, and plumose; j2, s2, r2, s6, S1, S2, S4, S5, Z3, Z4, Z5, and J2 pilose; other dorsal setae simple.

Venter (Fig. 36): Tritosternum as in female. Sternoventral shield longer than wide, 267 (275–400) long and 207 (205–210) wide at level of coxae II (n=3); l.m.t. broken medially; shield with 5 pairs of simple setae and 3 pairs of pores; most setae long and surpassing insertions of setae behind them.

Anal shield as in female with pair of paranal setae, 1 postanal seta, and pair of cribal pores on posterior margin; all setae simple. Cribrum located on lateral margin of anal portion and its extensions surpassing level of paranal setae. Opisthogastric setae simple and slightly pilose. Peritreme and peritrematic shield as in female.

Gnathosoma (Fig. 37): Gnathosoma as in female; tectum shown in Fig. 38. Fixed digit of chelicera (Fig. 39) with simple dorsal seta, robust median tooth, small distal tooth, *pilus dentilis*, and terminal hook; movable digit with median tooth, spermatodactyl, and terminal hook; arthrodial process strongly pilose; length of fixed digit 283 (n=1), length of movable digit 113 (102.5–122.5) (n=3).

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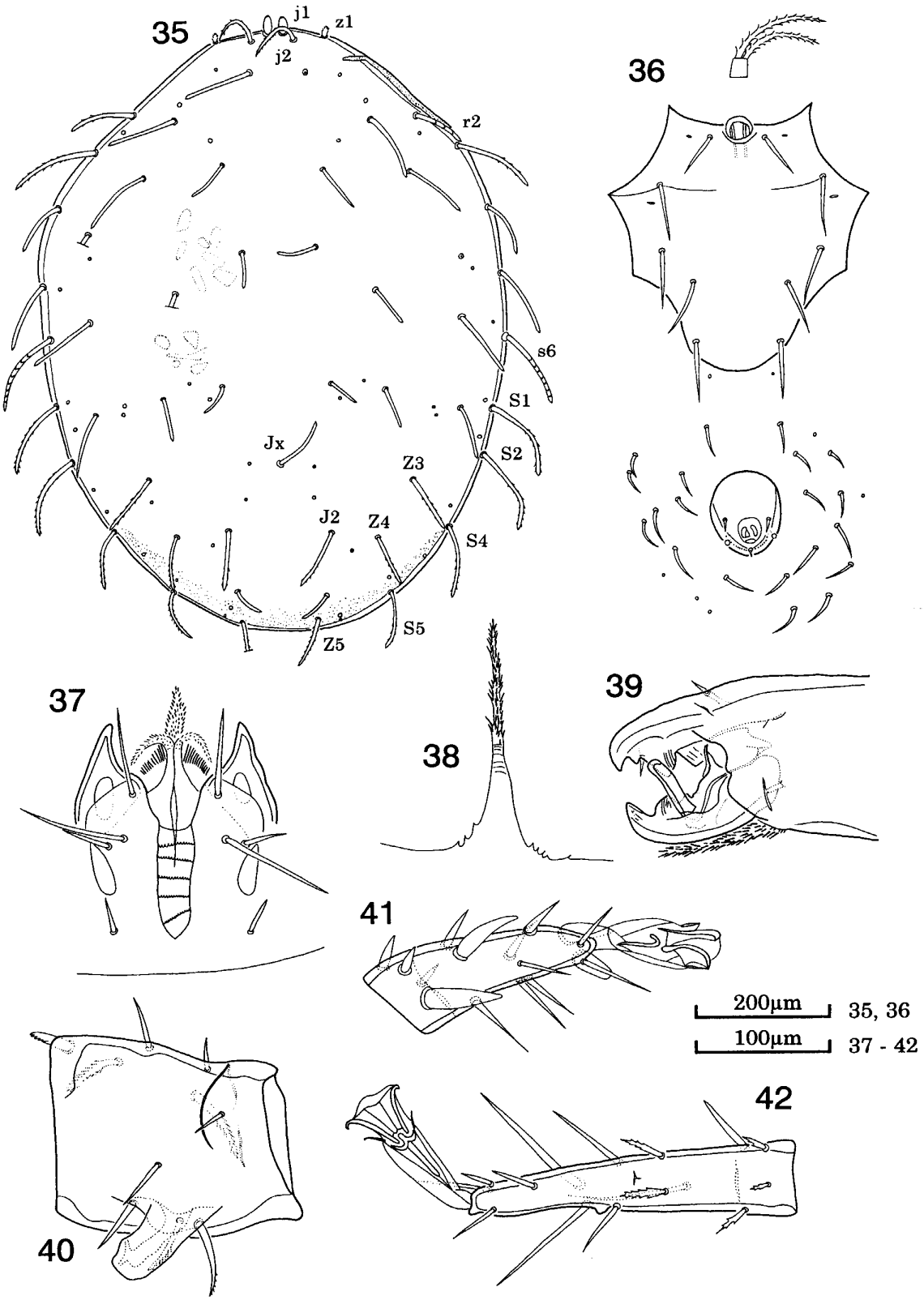

Figs 35–42. *Neopodocinum subjaspersi* sp. nov., male, paratype (MZB.Acar.2276). 35, dorsum; 36, venter; 37, ventral view of gnathosoma; 38, tectum; 39, chelicera; 40, femur II; 41, tarsus II; 42, tarsus IV.

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Legs (Figs 40–42): Tarsus I without ambulacrum and claw; tarsi II–IV with developed ambulacra and claws. Most leg segments with simple setae and pilose, plumose, or pectinate setae, except for coxae I–IV and trochanters I and III with only simple setae; coxa I with ventral ridge; coxae II–IV each with 2 posterior ridges; femur II (Fig. 40) with large spur; genu and tibia II each with spur; tarsus II with thick setae (Fig. 41); tarsus IV (Fig. 42) with protuberance. Leg chaetotaxy typical for this genus; trochanter II with 4 simple setae; genu IV with 7 simple and plumose setae. Leg length (except ambulacrum, n=3); leg I, 658 (625–680); leg II, 753 (735–765); leg III, 732 (680–765); leg IV, 1045 (955–1150).

Deutonymph. Length of dorsal shield 757 (730–770), width 432 (400–450) (n=3). Living specimens reddish or yellowish brown.

Dorsum (Fig. 43): Dorsal shield attenuated posterior and with lateral incision behind dorsal setae s6; shield bearing 28 pairs of dorsal setae and 19 pairs of pores; unpaired Jx seta present; j1 and z1 short and either pilose distally or simple; setae j2, S4, and S5 simple or slightly pilose; other setae simple.

Venter (Fig. 44): Tritosternum as in female. Sternoventral shield longer than wide, 250 (245–255) long and 172 (170–175) wide at level of second sternal pore (n=3); surface of shield ornamented with slight reticulation (indistinct reticulation in Fig. 44 due to shrinkage) and with 4 pairs of simple setae and 3 pairs of pores; lengths of setae similar to each other.

Anal shield oval, longer than wide, 118 (110–125) long and 72 (70–75) wide; shield with pair of paranal setae and 1 postanal seta; all setae simple; pair of pores located lateral of cribum. Cribrum located on lateral margin of anal shield; its anterior extensions surpassing level of paranal setae. Opisthogaster bearing about 20 pairs of simple setae and 3 pairs of pores. Peritreme as in female. Postcoxal pore free from podal shield.

Gnathosoma (Fig. 45): Gnathosoma as in female; tectum shown in Fig. 46; internal posterior hypostomal setae longer than other hypostomal and palpcoxal setae. Fixed digit of chelichera (Fig. 47) with simple dorsal seta, robust median tooth, small distal tooth, *pilus dentilis*, and terminal hook; movable digit with median bidentate tooth, small distal tooth, and terminal hook; arthrodial process strongly pilose; length of fixed digit 200 (197.5–215) and of movable digit 83 (77.5–85) (n=3).

Legs: Tarsus I without ambulacrum and claw; tarsi II–IV with developed ambulacra and claws. Most leg segments with both simple and pilose setae, except for coxae I–IV, tarsus I, and trochanters I, III, and IV with only simple setae; tarsus II with simple and thick setae. Coxa I, trochanters I and III each with ventral ridge; coxae II–IV with 2 posterior ridges. Leg chaetotaxy typical for this genus; trochanter III with 4 setae; genu IV with 7 setae, and its chaetotaxy 1,2/1,2/1,0. Leg length (except ambulacrum, n=3): leg I, 507 (500–510); leg II, 570 (560–585); leg III, 527 (505–545); leg IV, 658 (630–700).

Protonymph. Length of podonotal shield 388 (375–405), width 343 (315–360) (n=6). Length of opisthonotal shield 155 (140–165), width 297 (295–305) (n=6). Living specimens yellowish brown.

Dorsum (Fig. 48): Podonotal shield convex posteriorly, ornamented with strong punctations posteriorly and laterally; other parts with reticulation and

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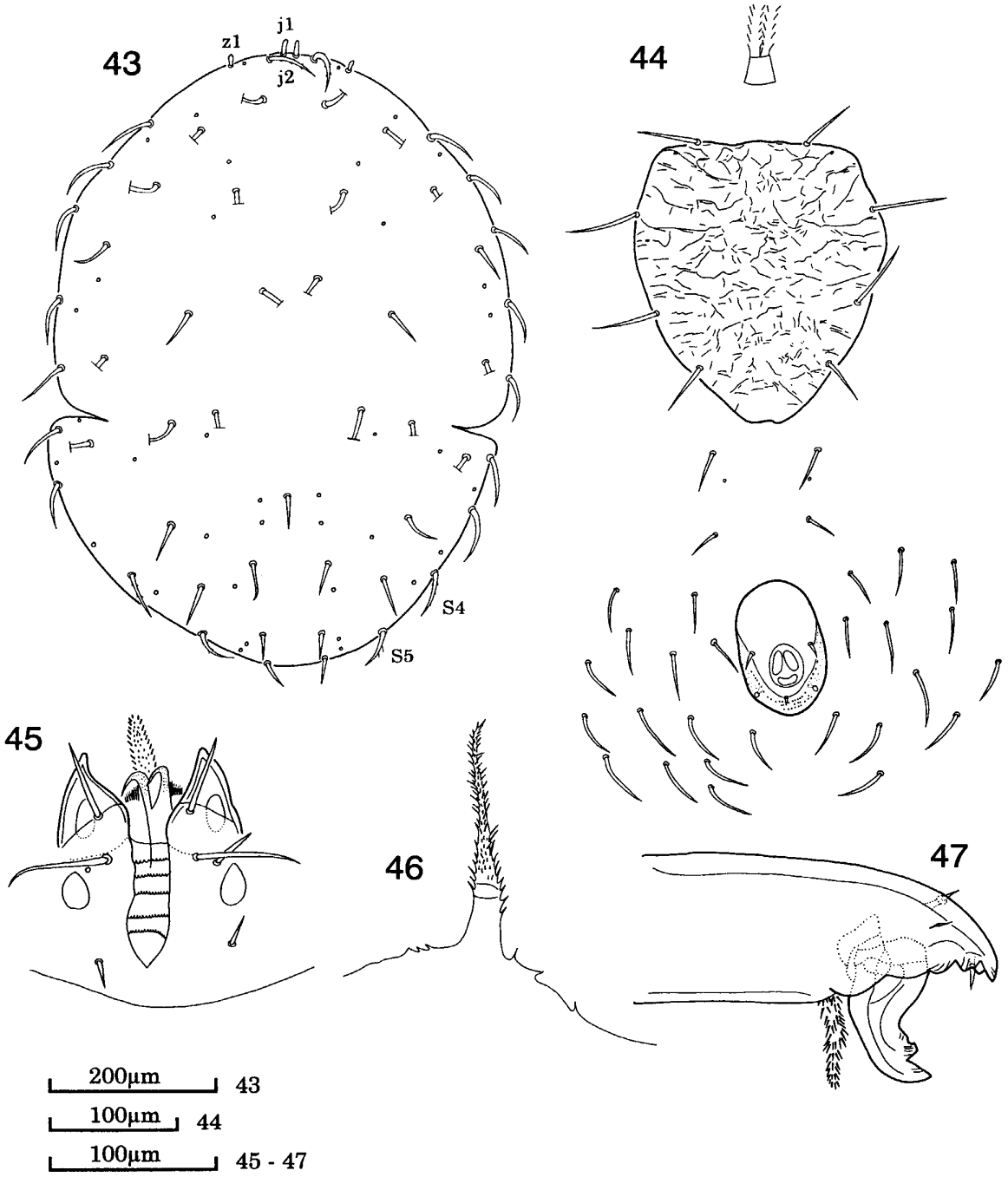

Figs 43–47. *Neopodocinum subjaspersi* sp. nov., deutonymph, paratype (MZB.Acar.2268). 43, dorsum; 44, venter; 45, ventral view of gnathosoma; 46, tectum; 47, chelicera.

punctations; shield bearing 11 pairs of pectinate setae and 3 pairs of pores; j1 short, broad, and plumose; j2 long and pectinate; other podonotal setae strongly pectinate. Opisthonotal shield concave anteriorly, ornamented with punctations, and with 8 pairs of setae and 7 pairs of pores; seta Jx absent; J2 and J5 simple, and other setae strongly pectinate.

Venter (Fig. 49): Tritosternum as in female. Sternoventral shield ornamented with slight reticulation and punctations; shield longer than wide, 196 (190–200) long

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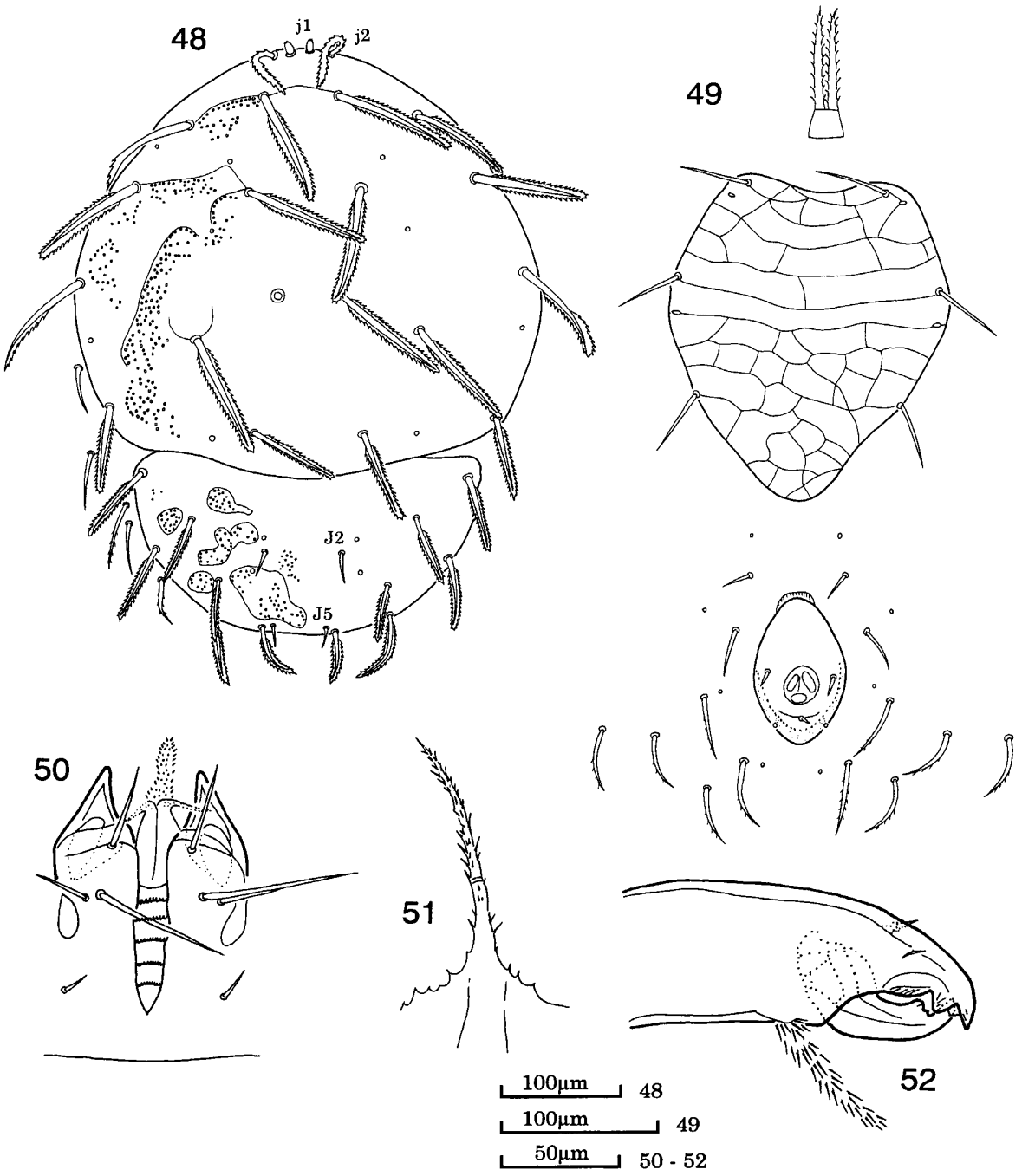

Figs 48–52. *Neopodocinum subjaspersi* sp. nov., protonymph, paratype (MZB.Acar.2273.1). 48, dorsum; 49, venter; 50, ventral view of gnathosoma; 51, tectum, 52, chelicera.

and 130 (120–140) wide (n=6); l.m.t. complete but not straight; shield bearing 3 pairs of simple setae and 2 pairs of pores.

Anal shield long, oval, longer than wide, 105 long and 60 wide; shield ornamented with punctations and bearing pair of paranal setae, 1 postanal seta, and pair of pores; all setae simple. Cribrum located on lateral margin of anal shield, and its anterior extensions surpassing level of paranal setae. Opisthogaster bearing 6 pairs of setae and pores; 2 pairs of opisthogastric setae simple, and other

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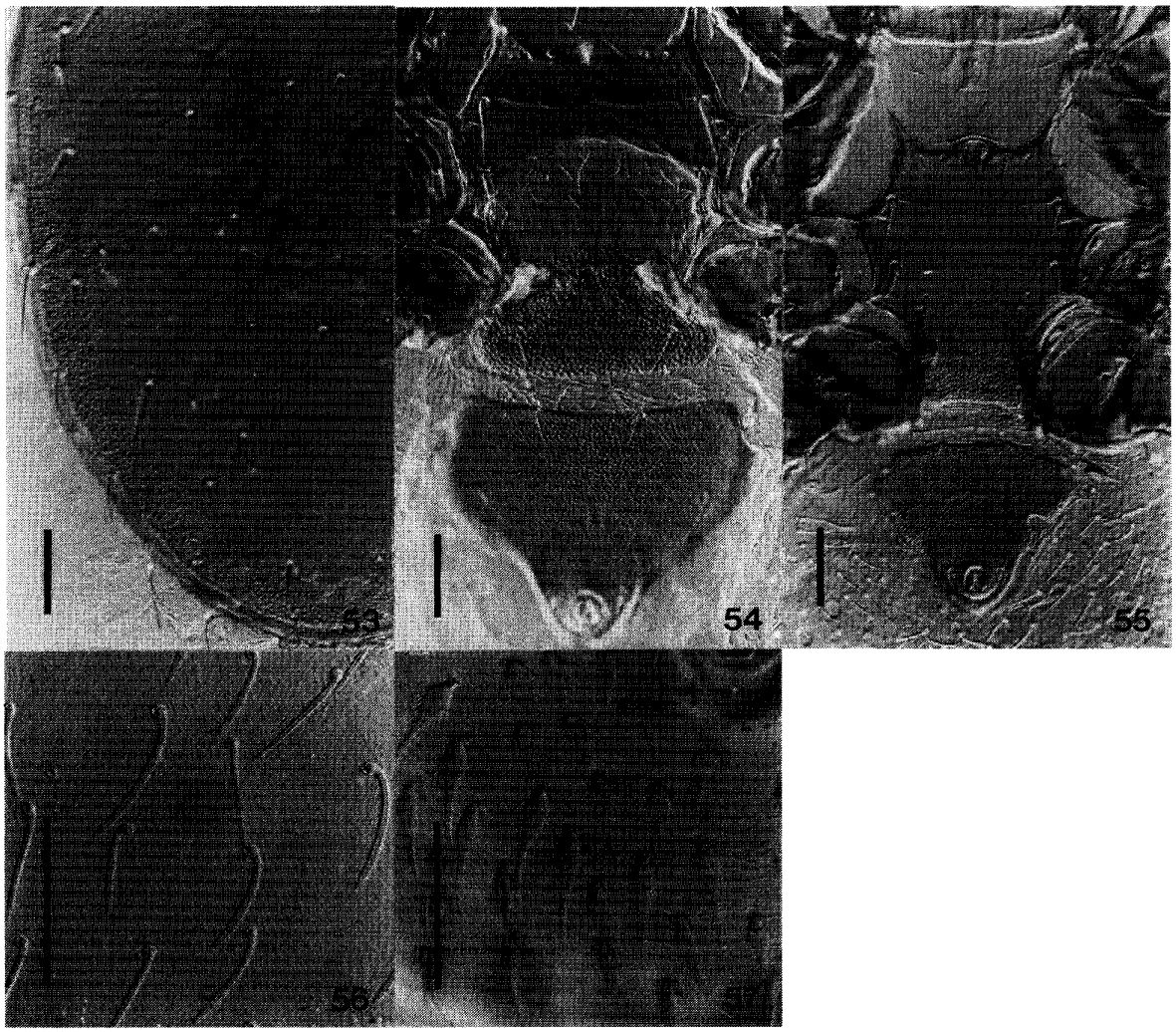
setae pectinate.

Gnathosoma (Fig. 50): Gnathosoma as in female; tectum shown in Fig. 51; palpal chaetotaxy of trochanter, femur, and genu 1-4-5; internal posterior hypostomal setae longer than other hypostomal and palpcoxal setae. Fixed digit of chelicera (Fig. 52) with smooth, simple seta, robust median tooth, small distal tooth, *pilus dentilis*, and terminal hook; movable digit with bidentate median tooth, small distal tooth, and terminal hook; arthrodial process strongly pilose; length of fixed digit 148 (122.5–160) and of movable digit 65 (55–72.5) (n=6).

Legs: Tarsus I without ambulacrum and claw; tarsi II–IV with developed ambulacra and claws. Most leg segments with both simple and pectinate setae, except for coxae I–IV, trochanters I and IV, tarsus I, and femur IV with only simple setae; most setae on tarsus II thick; coxa I with ventral ridge and coxae II–IV each with 2 posterior ridges. Leg chaetotaxy typical for protonymph of this genus; trochanter



Figs 53–57. Microphotographs (DIC) of *Neopodocinum halimunensis* sp. nov. (53–55), *N. subjaspersi* sp. nov. (56), and *N. jaspersi* (Oudemans, 1900) (57). 53, female dorsal shield (MZB.Acar.2311.1); 54, female venter (MZB.Acar.2311.1); 55, male venter (MZB.Acar.2312.1); 56–57, female opisthogastric setae [56, MZB.Acar.2312.1; 57, Bali specimen (private collection)]. Scale bars=100 μm.

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III with 4 setae; genu IV with 5 setae, and its chaetotaxy 1,2/0,2/0,0. Leg length (except ambulacrum, n=6): leg I, 372 (340–405); leg II, 432 (400–475); leg III, 415 (400–440); leg IV, 468 (445–495).

Type series. Holotype: female (MZB.Acar.2275), 950 m above sea level, Halimun National Park, Cikaniki, Bogor, Indonesia, 1 April 2001, E. Cholik and Sarino leg., *ex Onthophagus* sp. Paratypes: 8 females, 3 males, 3 deutonymphs, and 6 protonymphs, same data as holotype; 1 male, 26–30 October 2000, E. Cholik leg., other data same as for holotype; 1 protonymph, 27 January 2001, E. Cholik leg., other data same as for holotype; 1 female and 1 male, 25–26 June 2001, other data same as for holotype.

Etymology. The species name refers to its morphological similarity to *N. jaspersi*.

Remarks. This new species is similar to *Neopodocinum jaspersi* (see Oudemans 1900, 1902) from the Netherlands [probably accidentally brought from warmer region (Oudemans 1902; Krantz 1965)], Java, and central India. As the result of a comparison with the holotype and additional specimens of *N. jaspersi*, *N. subjaspersi* proves to be distinguishable from it by the following characters (corresponding conditions of *N. jaspersi* in parentheses): 1) most dorsal setae, e.g., j3, z2, z4, s5, Z1, Z3, and Z4, simple in female (pectinate); 2) j3, z2, z4, s5, and Z1 simple in male (pectinate); 3) female opisthogastric setae simple or slightly pilose as in Figs 28, 29, and 56 (some setae plumose and broadened medially as in Figs 30, 31, and 57).

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